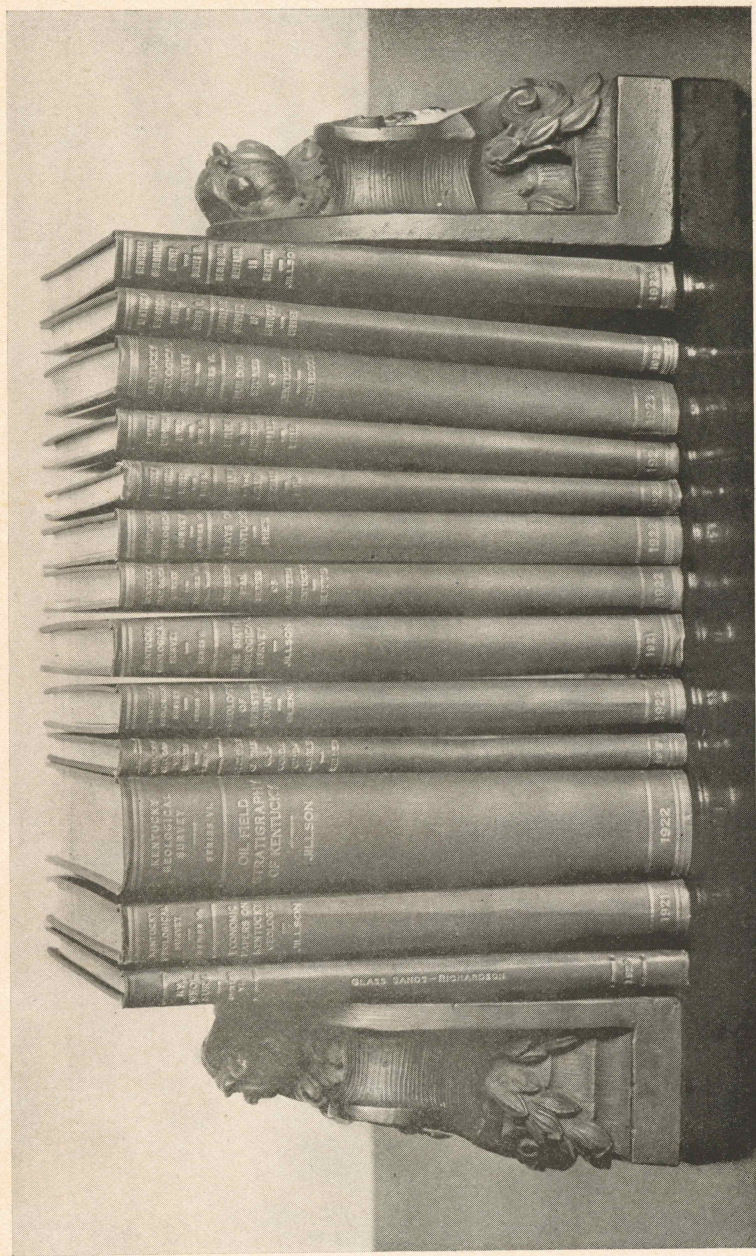


Administrative Report
For The (Sixth)
Kentucky
Geological Survey
(Years 1922 and 1923)

By
WILLARD ROUSE JILLSON
Director and State Geologist



Reprint from Series VI,
Volume Twelve
KENTUCKY GEOLOGICAL SURVEY
FRANKFORT, KENTUCKY
1923



PUBLICATIONS OF THE (SIXTH) KENTUCKY GEOLOGICAL SURVEY.

These geological reports cover the range of Kentucky's mineral resources, and also present divisions of its stratigraphy and structure. Totalling thirteen separate and distinct volumes, they comprise all of the bound works of the Kentucky Geological Survey from April 1, 1920 to date. Twelve additional manuscripts of very great economic value besides a large number of county maps have been prepared by the Survey and are now ready for the printer, but no funds are available for their publication.

ADMINISTRATIVE REPORT

For the (Sixth)

KENTUCKY

GEOLOGICAL SURVEY

YEARS 1922 AND 1923

By

WILLARD ROUSE JILLSON

Director and State Geologist

PREPARED FOR THE GOVERNOR
AND THE LEGISLATURE

*One Topographic Index
Map of Kentucky*

Reprint from Series VI,
Volume Twelve
KENTUCKY GEOLOGICAL SURVEY
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1923

THE STATE JOURNAL COMPANY
Printer to the Commonwealth
Frankfort, Kentucky.

Administrative Report
For The (Sixth)
KENTUCKY GEOLOGICAL SURVEY

Years 1922 and 1923

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GOVERNING STATUTE

The act creating and governing the (Sixth) Kentucky Geological Survey and making appropriations for same is entitled as follows:

“An Act creating the Kentucky Geological Survey, designating its chief executive officer and his duties, and providing funds for its maintenance.”¹

This act, in conjunction with the Budget Bill of 1922, provided a total of \$40,500.00 for the maintenance of the prescribed activities of the the Kentucky Geological Survey. This appropriation is divided into two funds: (1) Co-operative topographic mapping fund of \$17,500.00, and (2) General Geological Fund of \$23,000.00. In accordance with the statute the first fund has been used in a “dollar for dollar” co-operation with the U. S. Geological Survey in an extension of the topographical base map of Kentucky. The second fund has been used for the maintenance of the Kentucky Geological Survey proper, payment of salaries, field expense, and miscellaneous charges, including printing.

PERSONNEL OF THE SURVEY

The personnel of geological assistants¹ and trained office workers employed on the (Sixth) Kentucky Geological Survey during the past biennium is given below. Most of these assist-

¹ Acts of the General Assembly of the Commonwealth of Kentucky Chapter 34, p. 141. 1920.

ants are classified as "temporary employees" having been engaged for the summer field season of two or three months to do a special piece of geological or mineral resource investigation:

DIRECTOR AND STATE GEOLOGIST

WILLARD ROUSE JILLSON, B. S., M. S., Sc.D., Frankfort, Kentucky.*

ASSISTANT GEOLOGISTS

CHARLES HENRY RICHARDSON, Ph. D., Head of the Department of Geology, Syracuse University, Syracuse, New York.

STUART WELLER, Ph. D., Head of the Department of Paleontology, University of Chicago, Chicago, Illinois.

LEONIDAS CHAMBERS GLENN, Ph. D., Head of the Department of Geology, Vanderbilt University, Nashville, Tennessee.

HEINRICH RIES, Ph. D., Head of the Department of Geology, Cornell University, Ithaca, New York.

ARTHUR MCQUISTON MILLER, M. A., Head of the Department of Geology, University of Kentucky, Lexington, Kentucky.

WALTER H. BUCHER, Ph.D., Acting Head of the Department of Geology, University of Cincinnati, Ohio.

CHARLES BUTTS, M. S., Geologist, U. S. Geological Survey, Washington, D. C.

WALTER GREELEY BURROUGHS, M. S., Head of the Department of Geology, Berea College, Berea, Kentucky.

LOUIS W. CURRIER, M. S., Associate Professor of Mineralogy, Syracuse University, Syracuse, New York.

JAMES S. HUDNALL, B. S., Bowling Green, Kentucky.

GEOLOGIC AIDES

BENJAMIN B. COX, B. S., Chicago, Illinois.

GEORGE W. MORRIS, A. B., University of Cincinnati, Cincinnati, Ohio.

CHARLES VERNON THIES, C. E., University of Cincinnati, Cincinnati, Ohio.

SAMUEL M. MAYFIELD, B. S., Berea College, Berea, Kentucky.

GEOGRAPHERS

DARRELL HAUG DAVIS, Ph. D., Head of the Department of Geography, University of Minnesota, Minneapolis, Minn.

K. C. McMURRAY, Ph.D., Department of Geography, University of Michigan, Ann Arbor, Michigan.

JOHN B. LEIGHLY, A. B., University of California, Berkeley, California.

*During the past biennium there were only three regular or full time employees on the Kentucky Geological Survey. These have been indicated by an asterisk. All other employees are temporary, periods ranging from 3 weeks to 3 months.

CLARENCE W. NEWMAN, A. B., Department of Geology, University of Colorado, Boulder, Colorado.

CARL O. SAUER, Ph.D., Head of the Department of Geography, University of California, Berkeley, California.

VARIOUS

W. D. FUNKHOUSER, Ph.D., Head of the Department of Zoology, University of Kentucky, Lexington, Kentucky, Zoologist.

ADOLPH CARL NOE, Ph.D., Associate Professor of Botany, University of Chicago, Chicago, Illinois, Paleobotanist.

REINHARDT THIESSEN, Ph.D., U. S. Bureau of Mines, Pittsburg, Pa., Paleobotanist.

CHARLES STEVENS CROUSE, M. S., Professor of Metallurgy, University of Kentucky, Lexington, Kentucky., Oil Shale Technologist.

A. M. PETER, Sc.D., Head of the Department of Chemistry, Agricultural Experiment Station, University of Kentucky, Lexington, Kentucky, Chemist.

WARREN R. KING, C. E., U. S. Geological Survey, Division Water Resources, Chattanooga, Tennessee., Water Resource Engineer.

JOSEPH L. BISSELL, Frankfort, Kentucky, Draftsman.

F. W. BERTSCH, A. B., University of Cincinnati, Cincinnati, Ohio, Draftsman.

LAFAYETTE B. HERRING, A. B., Lexington, Kentucky, Statistician.

J. FORREST CUSICK, Frankfort, Kentucky, Photographer.

HUBERT DIXON CRIDER, University of Kentucky, Lexington, Kentucky, Engineer.

GEORGE W. PIRTLE, University of Kentucky, Lexington, Ky., Engineer.

J. M. FRASURE, Frankfort, Kentucky, Chief Clerk.*

ANN M. CRITTENDEN, Frankfort, Kentucky, Manuscript Copyist.

CATHERINE B. McNAMARA, Frankfort, Kentucky, Stenographer and Accountant.*

SUMMARY OF ACTIVITIES

The field work of the Kentucky Geological Survey for the years 1922 and 1923 consisted of a number of detailed, and general geological and mineral resource investigations widely distributed throughout Kentucky. During this period the quadrangular work of Dr. Stuart Weller in Livingston, Caldwell and Crittenden counties on the structure and stratigraphy of the Mississippian rocks of this region has been continued. This section forms the northern portion of the well known western Kentucky fluorspar field. The reports which have been published on this section are as follows: Vol. 4, "The Geology of the Golconda Quadrangle," and Vol. 10, "The Geology of the Prince-

ton Quadrangle." The "Geology of the Cave-In-Rock (Marion) Quadrangle has been executed in the field and the manuscript and map has been prepared, but the report has not been published.

During the past two years Dr. Charles H. Richardson has been engaged in quarry studies which have resulted in the publication of Vol. 11, "The Building Stones of Kentucky." In this report are described 616 Kentucky quarries. Twenty-three new marbles rather widely distributed throughout the State are also indicated. This work is now available for public distribution. Dr. Richardson has also completed his work (Vol. 22) on the "Road Materials of Kentucky," which was done in co-operation with the State Department of Roads and Highways and the Kentucky Geological Survey. The field work and expense was met by the Road Department, while the geological work was directed through the Kentucky Geological Survey, which organization will also publish the report which is now in the hands of the printer.

A reconnaissance report (Vol. 13) on the "Fluorspar Deposits of Kentucky" has been completed by Prof. L. W. Currier and published by the Geological Survey. This treats of the occurrence of fluorspar in central and western Kentucky, but is not a detailed report as topographic base maps were not available for these sections when this work was executed.

Dr. D. H. Davis has completed a regional geographic study of the Jackson Purchase which has been published. This report (Vol. 9, "Geography of the Jackson Purchase") has had a wide distribution and met with popular approval. It brings out the fundamental economic relationship between the geography, physiography and geology of the region discussed. The State Geologist, Dr. W. R. Jillson, has prepared a report, Vol. 12, entitled "New Oil Pools of Kentucky." This bulletin describes the occurrence of recently mapped anticlines and domes at a number of points in Kentucky where oil and gas is now indexed, and indicates points where further prospecting may be expected to increase this production. He has also prepared a report (Vol. 15) entitled "Geological Research in Kentucky," which is a summary consideration of all the geology that has been published by the Kentucky Geological Survey, the U. S. Geological Survey,

and various technical societies relative to the geology of Kentucky. This report will soon be available and will do much toward making the older reports, many of which are now only to be found in libraries, of service to the public.

Warren R. King has prepared a report (Vol. 14) on the "Surface Waters of Kentucky," which gives volume and flow readings. This report is calculated to be of great benefit in assisting in the interpretation of the value of undeveloped hydroelectric power in Kentucky. It takes up all the major drainage courses of the State. This report is now in the hands of the printer.

Dr. William D. Funkhouser has prepared a report (Vol. 16) on a part of the zoology of Kentucky which will be of much benefit to the people of the State, particularly students. It deals systematically with the "Wild Life of Kentucky."

Prof. Arthur M. Miller has been engaged in mapping in detail the geology of Woodford, Jessamine and Fayette counties, and has completed the work in Woodford County. This report is now in the hands of the printer. The work on the other two counties is still in progress.

Prof. Wilbur G. Burroughs has executed two timely reports, one (Vol. 19) on the "Geography of the Knobs of Kentucky," and another (Vol. 24) on the "Geography of the Western Kentucky Coal Field." Both of these reports are in the hands of the printer.

Dr. Walter H. Bucher has completed his detailed studies of the Jephtha Knob of Shelby county, which exhibit very interesting and unusual structural conclusions.

Dr. D. H. Davis has extended his geographic studies and has executed (Vol. 18) the "Geography of the Mountains of Kentucky." This report is now in the hands of the printer. During the past summer he has completed the field work for a report (Vol. 23) on the "Geography of the Blue Grass Region." The manuscript for this report has been completed and is ready for the printer.

Dr. Carl O. Sauer, with a corps of assistants, including Professors McMurtry, Leighley and Newman, has been engaged during the past season in executing the field work on a report (Vol. 25) on the "Geography of the Mississippian Plateau in Ken-

tucky." This report is now in preparation. It completes the Survey's series of six regional geographic studies in Kentucky.

A group of papers on the Oil Shales of Kentucky have been prepared by Professor Charles Stevens Crouse, Dr. Rheinhardt Thiessen, and Dr. David White. These papers are now in the hands of the printer and will be published in the near future. They add much to our technical knowledge of the Ohio (Chattanooga) oil shale in Kentucky.

The State Geologist, Dr. W. R. Jillson, has prepared a report (Vol. 20) on the "Coal Industry in Kentucky," which takes up the history of the industry, its present distribution, and its productivity. Besides a general discussion of the geology of the coals of Kentucky, this report gives for the first time a list of all the commercially important coal mines in the State.

The name of the coal that each of these 750 mines is operating is also given in this report. Dr. Jillson has also prepared a new (Jan. 1, 1923) general geological map of the State of Kentucky which is greatly improved over all previous editions. The fault pattern in so far as it is now definitely known in Kentucky is indicated on this map, as is the Eastern Kentucky Geosyncline. All of the oil and gas pools are indicated, together with their pipe line connections, and each of the 750 coal mines now operating in the State is located as accurately as the scale will permit. Value and volume figures for coal, oil and fluorspar from 1914 to 1922 are given on this map.

Separate from the colored geological map, the Survey has prepared and published a new edition of the base map of the State of Kentucky, scale 1 inch equals 10 miles. This map is printed in two colors, black and blue, the blue being used to designate the streams. The background of the new map is white, which will make it useful for teachers, students and others.

In the course of investigations carried on during the past two years all of the counties in Kentucky have been covered in one or more respects. Most of the counties appear in all of the reports either directly or indirectly. Detailed geological investigations, however, have necessarily had to be confined to areas which had been previously topographically base mapped, as no other accurate base map exists on which accurate elevations are to be found.

The Kentucky Geological Survey under the personal direction of the State Geologist has prepared a series of eighteen (18) new reconnaissance black and white geographical county maps, most of them for counties which have never before been mapped. The scale in most instances is 1 inch equals 1 mile. These maps are road and stream maps and do not carry elevations, and are not suitable for detailed geological work, but are suitable for, and much in demand by tourists, farmers, road engineers, sanitary engineers, contractors and many others. Counties so mapped were: Boone, Kenton, Campbell, Bracken, Pendleton, Harrison, Grant, Anderson, Gallatin, Carroll, Owen, Franklin, Livingston, Lyon, Scott and Bourbon. The maps of Franklin and Anderson are now in the hands of the printer. Three (3) new oil and gas maps have been prepared for Cumberland, Monroe and Metcalfe counties in southern Kentucky, scale 1 inch equals 1 mile. These counties had never been previously surveyed. The detailed geology for Webster County and Woodford County has also been done, the first by Dr. Glenn and the second by Professor Miller. The Webster County map has been published and is available for distribution; the Woodford County map, however, is still in the hands of the draftsman as is a new map of McLean County.

The detailed oil and gas structural geology has been prepared by county units for six (6) eastern Kentucky counties during the past several years. These counties are: Floyd, Martin, Pike, Perry, Leslie and Boyd. Field work is now in progress in Lawrence County, which will complete the Big Sandy Valley. This work has been executed by James S. Hudnall, under the personal direction of the State Geologist. The Perry, Leslie and Boyd County maps are now in the hands of the printer. All of these maps are scaled 1 inch to the mile, and are much in demand. The completion of the Lawrence County map in the near future will give twenty-eight new county maps for the public use. These have all been prepared during the last two years by the survey.

TOPOGRAPHIC BASE MAPPING

During the years 1922 and 1923 co-operative topograph-

base mapping executed by the Kentucky Geological Survey and the U. S. Geological Survey in a "dollar for dollar" co-operation has been extended, and \$17,500.00 as appropriated by the legislature, has been devoted to this purpose by Kentucky. The Director of the Kentucky Geological Survey has designated the areas to be mapped, and the Director of the U. S. Geological Survey has supplied the men and the instruments, the maps being prepared and engraved by the U. S. Geological Survey. As a result of this co-operative agreement the following sheets have been completed: (1) Bowling Green, (2) Brownsville, (3) Frankfort and (4) Mammoth Cave. Field work has been extended to complete the Cub Run, Leitchfield and Horse Branch sheets. The Lucas (Scottsville) and the Waddy (Leitchfield) topographic sheets are 50% and 75% completed respectively.

At the present time, of the 40,598 square miles in Kentucky 19,898 square miles are base mapped topographically, and 20,705 square miles remain to be mapped. It is very urgent that this unmapped area be base mapped as soon as possible, as this unmapped area is responsible for holding back the development of a large part of the mineral resources of Kentucky. The States which have completed their topographic base maps are: Ohio, West Virginia, Maryland, Delaware, New Jersey, New York, Connecticut, Rhode Island and Massachusetts. Pennsylvania is about 95% base mapped, and Virginia about 80% base mapped. Kentucky will continue to trail behind her sister states in the development of her mineral resources until this State like other advanced and progressive states of the Appalachian district is entirely topographically base mapped. In its annual session at New Orleans December 3-6, 1923, the American Association of State Highway officials recommended by detailed resolution which has been forwarded to your office the rapid completion of the Topographic base map. This mapping has also been recommended by the Kentucky Department of State Roads and Highways in their last official report to your excellency and the Legislature. It is of prime importance to the development of Kentucky.

OFFICE WORK

The office work of the Kentucky Geological Survey has been

carried on during the past biennium by three regular or full-time employees, including the State Geologist, and has totaled 15,600 letters received, and 14,563 sent out. The average number of letters received per day has been 27, and the average number sent out per day has been 25. A detailed statement by months is given in the following table:

CORRESPONDENCE THROUGH THE U. S. POST OFFICE AT FRANKFORT, KY., FOR THE TWO FISCAL YEARS

JULY 1, 1921 TO JUNE 30, 1923, INCLUSIVE

Year	Month	Letters Received	Letters Sent
1921.....	July	586	566
1921.....	August	594	662
1921.....	September	676	636
1921.....	October	750	785
1921.....	November	680	616
1921.....	December	699	626
1922.....	January	640	601
1922.....	February	721	673
1922.....	March	825	736
1922.....	April	522	468
1922.....	May	677	562
1922.....	June	602	560
Total July 1, 1921 to June 30, 1922, inclusive.....		7,972	7,491
1922.....	July	705	542
1922.....	August	671	625
1922.....	September	566	545
1922.....	October	649	589
1922.....	November	552	530
1922.....	December	612	597
1923.....	January	625	596
1923.....	February	596	548
1923.....	March	759	713
1923.....	April	684	622
1923.....	May	694	667
1923.....	June	515	498
Total July 1, 1922 to June 30, 1923, inclusive		7,628	7,072
Grand Total for the two years ending June 30, 1923....		15,600	14,563
Daily Average		27	25

The smaller number of letters written and sent out is accounted for by the fact that a considerable portion of the correspondence calls for certain reports and maps and does not require other official reply.

One of the chief activities of the Kentucky Geological Survey is the furnishing of detailed and accurate geological and scientific information concerning the geology, mineral and natural resources of Kentucky. In this State and international service during the past biennial period 17,427 geological reports and maps have been sent from this office in response to written or personal requests accompanied by separate amounts of postage as required by law as shown by the following statement:

KENTUCKY GEOLOGICAL SURVEY PUBLICATIONS DISTRIBUTED UPON REQUEST

FIRST FISCAL YEAR, 1921-1922

Year	Mo.	Number Mailed	Number Carried Away	Total
1921—July	638	59	747
1921—August	632	120	752
1921—September	532	60	592
1921—October	764	95	859
1921—November	488	147	635
1921—December	284	86	370
1922—January	835	26	861
1922—February	823	250	1,073
1922—March	905	91	996
1922—April	482	75	557
1922—May	859	67	926
1922—June	563	186	749
Total for Fiscal Year Ending 1921-1922				9,117
1922—July	452	67	519
1922—August	417	140	557
1922—September	495	86	581
1922—October	459	167	626
1922—November	596	40	636
1922—December	697	300	997

Year	Mo.	Number Mailed	Number Carried Away	Total
1923—January	903	89	992
1923—February	398	94	492
1923—March	702	174	876
1923—April	741	77	818
1923—May	454	146	600
1923—June	428	188	616
Total for Fiscal Year 1922-1923				8,310
Grand total for two Fiscal Years 1921-1922 and 1922-1923 ..				17,427
Daily Average				30

The reports and maps distributed as indicated above pertain to every subject relative to the geology, soils and mineral resources of Kentucky. These publications have been sent, not only to every place in Kentucky, but throughout the United States; also Canada, Mexico, England, France, Germany, Japan and China. Requests for publications of the Kentucky Geological Survey through foreign libraries, industrial corporations and institutions is a growing one. The total amount of postage received in this service was re-used directly during the past biennium and has amounted to \$1,876.54. Since this amount of postage thus obtained is in effect a revolving unit being used as quickly as it is taken in, amounts in excess of a few dollars are never maintained in the office of the Survey. Of all the considerable amount of business which has proceeded through the U. S. post office for first-class correspondence and second-class mail or publications, not one penny has been drawn from the treasury of the State of Kentucky. In this respect the Kentucky Geological Survey is entirely self-supporting. The monthly and annual totals of postage received by the Kentucky Geological Survey follows:

FIRST FISCAL YEAR, 1921-1922

July	.....	\$70.68
August	.....	49.50
September	.....	69.75
October	.....	54.30
November	.....	51.60
December	.....	25.00

January	\$49.00	
February	85.00	
March	53.00	
April	59.00	
May	78.00	
June	123.00	
Total	\$767.83	\$767.83

SECOND FISCAL YEAR, 1922-1923

July	\$50.50	
August	63.00	
September	41.00	
October	63.00	
November	43.00	
December	73.00	
January	48.50	
February	57.10	
March	68.00	
April	49.35	
May	38.00	
June	33.00	
Total	\$627.45	627.45
Grand total used in mailing parcel post packages		1,395.28
Letters mailed first fiscal year, 7,491, at 2c		149.82
Letters mailed second fiscal year, 7,072 2c		141.44
Approximate amount of postage used in this office for registered letters and manuscripts during the two years ..		190.00
Total postage used during the two fiscal years, 1921-1922 and 1922-1923		\$1,876.54

NEW PUBLICATIONS

The following publications have been prepared in 1922 and 1923:

- Vol. *7.—Series VI, Mississippian Series in Eastern Kentucky, by Charles Butts. 1922.
- Vol. 8.—Clay Deposits of Kentucky, by H. Ries. 1922.
- Vol. 9.—Geography of the Jackson Purchase, by D. H. Davis. 1923.

*Volumes No. 1 to 6 inclusive, were published by the Kentucky Geological Survey during 1920 and 1921, and are listed and discussed in the administrative report for that period.

- Vol. 10.—Geology of Princeton Quadrangle, by Stuart Weller and others. 1923.
- Vol. 11.—Building Stones of Kentucky, by Chas. H. Richardson. 1923.
- Vol. 12.—New Oil Pools of Kentucky, by W. R. Jillson. 1923. (In press.)
- Vol. 13.—Fluorspar Deposits of Kentucky, by L. W. Currier. 1923.
- Vol. 14.—Surface Waters of Kentucky, by W. R. King. 1923. (In press.)
- Vol. 15.—Geological Research in Kentucky, by W. R. Jillson. 1923.
- Vol. 16.—Wild Life in Kentucky, by W. D. Funkhouser. 1923. (In press.)
- Vol. 17.—Mineral Resources of Kentucky, by W. R. Jillson. 1923. (In press.)
- Vol. 18.—Geography of the Mountains of Kentucky, by D. H. Davis. 1923. (In press.)
- Vol. 19.—Geography of the Kentucky Knobs, by W. G. Burroughs. 1923. (In press.)
- Vol. 20.—Coal Industry in Kentucky, by W. R. Jillson. 1923. (In press.)
- Vol. 21.—Oil Shale of Kentucky, R. Thiessen, D. White and S. C. Crouse. 1924. (In press.)
- Vol. 22.—Road Materials of Kentucky, by Chas. H. Richardson. 1924. (In press.)

RECOMMENDATIONS TO THE GOVERNOR AND
LEGISLATURE

The general investigations of the Kentucky Geological Survey during the past five years have resulted in an examination of most of the commercially important mineral resources of Kentucky. Where good topographic base maps have been available detailed work has been done in so far as funds would allow it. The reports and maps which have been prepared have been eagerly sought by mineral operators and others as the Kentucky

Geological Survey is the only reliable source of information relative to the mineral resources and small unit maps of this State.

On July 1, 1923, a little more than one-half of the State of Kentucky remained unmapped with a topographic base. This unmapped area comprised 20,706 square miles as computed by the U. S. Geological Survey. The mapped area at this time comprised 19,893 square miles, giving a total of 40,598 square miles, or the total area of Kentucky.

The time has come when, if Kentucky is ever to secure a large development of its mineral and natural resources, detailed geological investigations must take the place of general reconnaissance work. In a list of about 35 minerals which occur in Kentucky, the following 13 are now of paramount economic importance, and should receive detailed consideration: Asphalt, Fluorspar, Fire Clays, Natural Gas, Bituminous Coals, Cement Materials, Barite, Petroleum, Marbles, Mineral Waters, Oil Shale, Molding Sands, Mineral Paints and Ochres. These resources can not be mapped in detail at the present time, or in the future, until topographic base maps (approximately 18x14 miles) are executed for the regions in which they occur. The flint fire clay deposits of northeastern Kentucky in Carter, Rowan, Elliott, Boyd, Greenup, Morgan and Lewis counties are among the best and largest in the United States. The cannel coals of eastern Kentucky, and particularly northeastern Kentucky in Morgan, Johnson, Magoffin, Floyd, Elliott and Rowan counties are the best in the United States, yet they have never been described in detail. These wonderful coals are deserving of careful geological investigation and mapping.

Asphalt occurs in Hart, Edmonson, Warren, Hardin, Grayson, Breckinridge, Hancock, Ohio, Logan, Butler and Muhlenberg counties in western Kentucky, and in Carter, Rowan, Elliott, Johnson and Letcher counties in eastern Kentucky. These deposits of rock asphalt, particularly those of western Kentucky, are far superior quantitatively and qualitatively to any other deposits in the eastern United States. No detailed report on rock asphalt is available, but one should be prepared in order that this great latent body of mineral resource wealth may be developed. Detailed reports are also needed on Bituminous Coals, Fluorspar, Barite, Petroleum, Natural Gas, Marbles, Mineral Waters,

Cement Materials, Oil Shales, Mineral Paints, Molding Sands, etc., of Kentucky.

During the past four years the funds provided for the Kentucky Geological Survey have been inadequate to meet the needs of the Survey and the demands imposed upon it by the general public. Funds have been so low as to make it impossible to maintain an Assistant Geologist of ability on the Survey throughout the year. From year to year an increasingly large amount of manuscript reports and mineral resource maps have remained unprinted due to lack of funds with which to publish them.

The total number of bound printed reports now in stock is 7,318, as compared to 10,612 in stock at the end of the last biennium. Although 5,500 new reports have been added there is a loss of 3,294 for the past two years. At this rate of decrease even with the new reports that will be added, there will be no printed reports for distribution to the general public in a little over four years. The only remedy for this alarming condition is an increase in the size of new editions. This cannot be done with the present small appropriations.

In the spring of 1922 and 1923 insufficient amounts in the geological fund were left in the State Treasury to meet the pay roll of the three regular employees of the Survey. This difficulty was obviated in one case by selling an old automobile, and in another instance by putting the entire geological survey to work for the Tax Commission. Such practices are not only discouraging to the best efforts of the Survey but are a real obstruction to satisfactory service to the State and general public. The Survey cannot longer be maintained and function to advantage on the small general appropriation of \$23,000.00. Many of the reports which are most in demand have been exhausted in edition, and not only is there no money in sight with which to print new editions of these valuable works, but there are no funds to bring out a large number of entirely new manuscripts which are ready for the printer.

The wealth of the State is found in the active development of its agriculture, its mineral resources and its manufacturing. The state which depends to a large extent upon any one of these orders of industry will be much poorer than one which is supported by two or three. Kentucky has long stood back, main-

tained almost entirely by its agriculture. Its mineral resources and industrial development have lagged. Coal, oil and gas have only begun during the last few years to be developed. It is thoroughly possible following a complement of the topographic base mapping of Kentucky and detailed geological investigations to bring out the resources of this State and give them the needed publicity. This will certainly result in the large flow of capital into Kentucky for development.

The production of minerals in this State and the re-use of Kentucky minerals in Kentucky for manufacturing purposes could be made very great. With such development will necessarily come large ad valorem assessments and an increase of tax moneys into both the State and county treasuries. The establishment of many new large pay rolls throughout particularly the "pauper" sections of Kentucky where undeveloped mineral resources are now known to occur will result in increased prosperity for these sections. This new industrialism will result in keeping Kentucky's manhood and womanhood in Kentucky rather than allowing it to drift out of the State from year to year, as it has always done in the past. The population of this State has remained practically stationary when compared with that of other states for several decades. Kentucky's area is nearly the same as that of the state of Ohio. Yet its population according to the last U. S. census is but about one-half of that of our northern sister state. The reason for this sad condition of affairs is found in the lack of interest in mineral resources and industrial development in Kentucky.

To enable the Kentucky Geological Survey to base map the State, detail its resources, and thus advance development, the following appropriations are recommended:

1. Annual appropriation of \$100,000.00 for co-operative topographic base mapping.
2. Annual appropriation of \$50,000.00 for the general purposes of the Kentucky Geological Survey, including geological investigations of resources, office administration, printing, etc.

This total appropriation of \$150,000.00 should be secured through the budget bill. There should also be appropriated through a separate bill in the present legislature an emergency

appropriation of \$17,000.00, so that a large number of the resource reports and maps which are now in the hands of the printer may be published and paid for forthwith, and thus be made available for the general public. This money will also allow road material investigations which are now much needed and should precede large road construction in Kentucky rather than follow it if the maximum mileage is to be secured at a minimum cost to the Department of State Roads and Highways. This work has been recommended by the Efficiency Commission in its recent report to the Legislature. If such an emergency appropriation is not appropriated, these reports, some of which have been in the hands of the printer for some time, will become old, and to a certain degree out of date before they can be presented to the public.

AVAILABLE MAPS AND REPORTS

There are now ready and available for immediate distribution through the Kentucky Geological Survey to any interested individual, corporation, company or institution requesting same a large number of special reports and maps, prepared by this and previous Surveys. These publications cover the general geology and development of many of the mineral resources of Kentucky. The early reports of the 1st and 2nd Geological Surveys are now entirely exhausted, with but a few exceptions. The publications of subsequent surveys, including the present or (Sixth) Kentucky Geological Survey, which are now available are listed in chronological sequence by titles and authors. The required postal charge and the number which are still available is indicated. The number of reports now in stock is 7,318. The total number of maps is 25,835. The total of maps and reports now available for distribution is 33,153. A request for any of these publications addressed to the Director, when accompanied by the required amount of postage (checks or money orders may be used) will be promptly filled until the edition is exhausted. The list given is essentially a duplicate of the one used in the official correspondence of the Kentucky Geological Survey.

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